

# **“So many lasers, so little time.”**

## **Automating Your Laser Safety Program**



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Release number LLNL-PRES-658919 External Audience

This work performed under the auspices of the U.S. Department of Energy by  
Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344

# Background



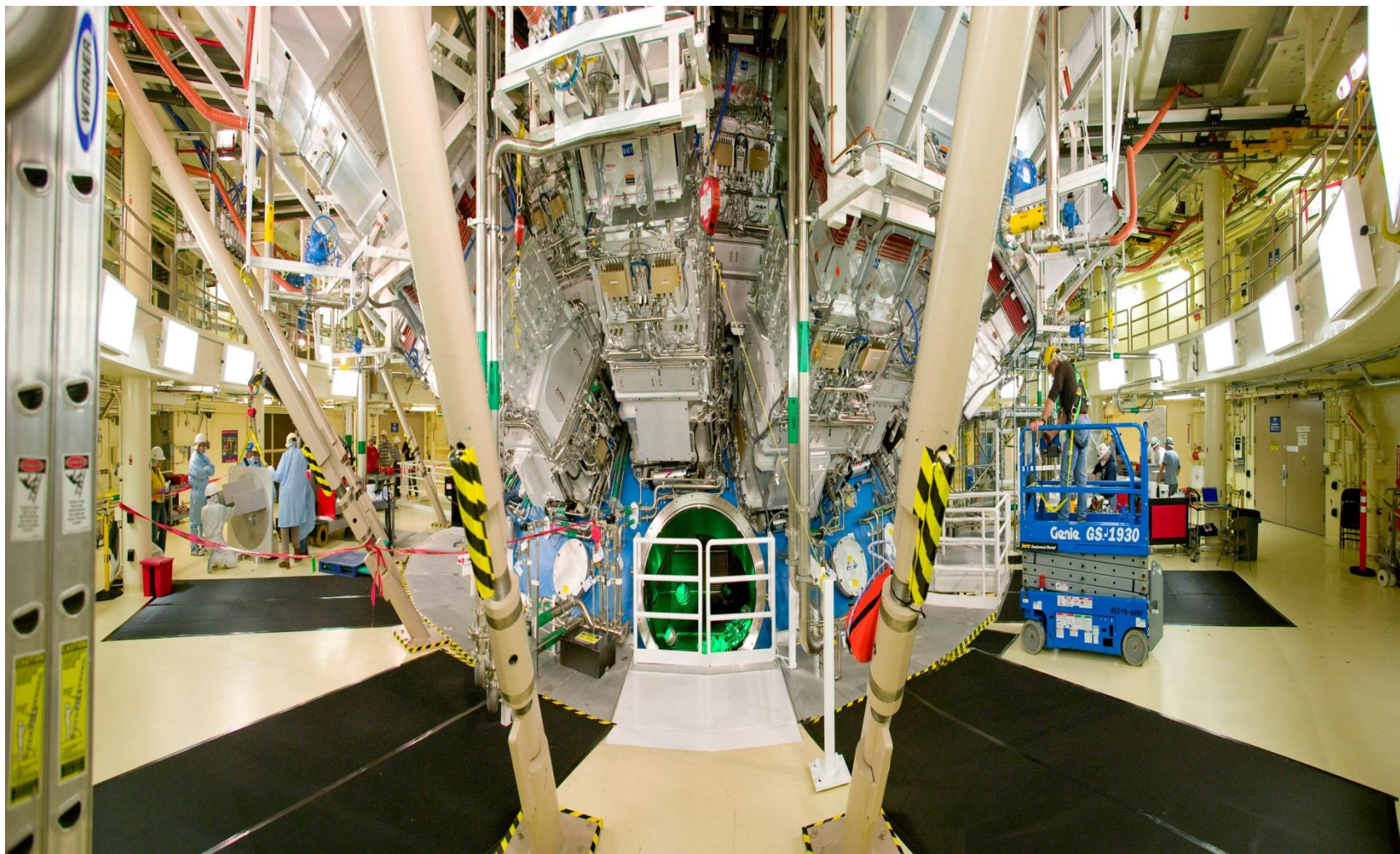


# Everything From Small Scale





# To Large Scale Laser Labs





# Lasers, Lasers, and More Lasers

System integration of these technologies into world-leading capabilities has been proven, with 40,000 person years of accumulated experience



**T-REX**  
(2005-2008)  
World's brightest laser  
gamma-ray source



**MEGa-ray**  
(under construction)  
World's 1st, 3rd  
generation gamma-ray  
light source



**AVLIS**  
(1985-1999)  
World's highest  
average power laser



**Heat Capacity Laser**  
(2005)  
World's highest  
average power solid-  
state laser



**Nova Petawatt**  
(1994-1996)  
World's highest peak  
power laser



**Mercury**  
(1999-2009)  
World's highest  
average power  
10 Hz laser



**NIF**  
(2003-present)  
World's most  
energetic laser



**ARC**  
(under  
construction)  
World's highest  
energy PW  
system

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# Personnel

LLNL Laser Safety Officer – Jamie King



Deputy Laser Safety Officers



Average of 21 Laser Labs per LSO

# The Program

**Work  
Authorization  
Documentation**

**Controlled  
Items/Services  
List**

**EZHaz® Laser  
Assessments**

**Laser Inventory**

**Annual Audits**

**Issues Tracking  
System**

# Room for Improvement

## What Worked

- Programs fulfilled regulatory requirements as well as LLNL program requirements.
- Effective managing annual laser audits.

## What Didn't

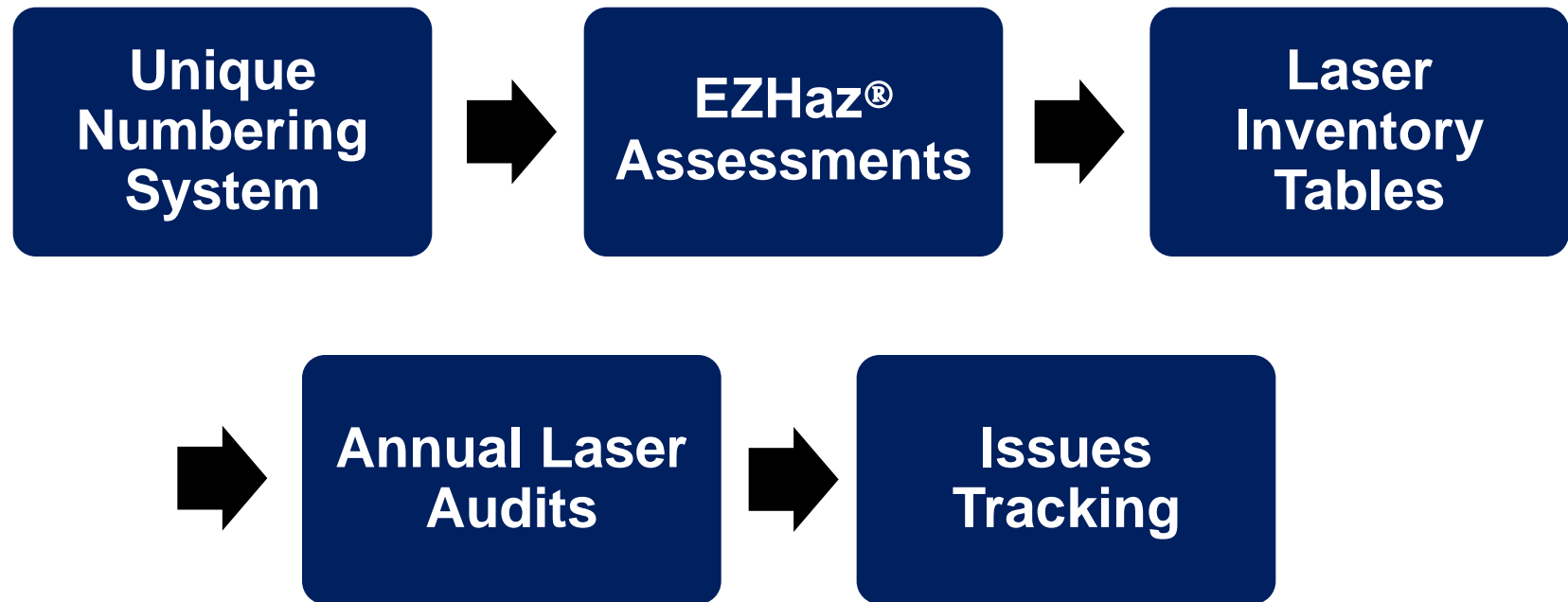
- Not effective managing laser database or overall program management.
- Very time and labor intensive.



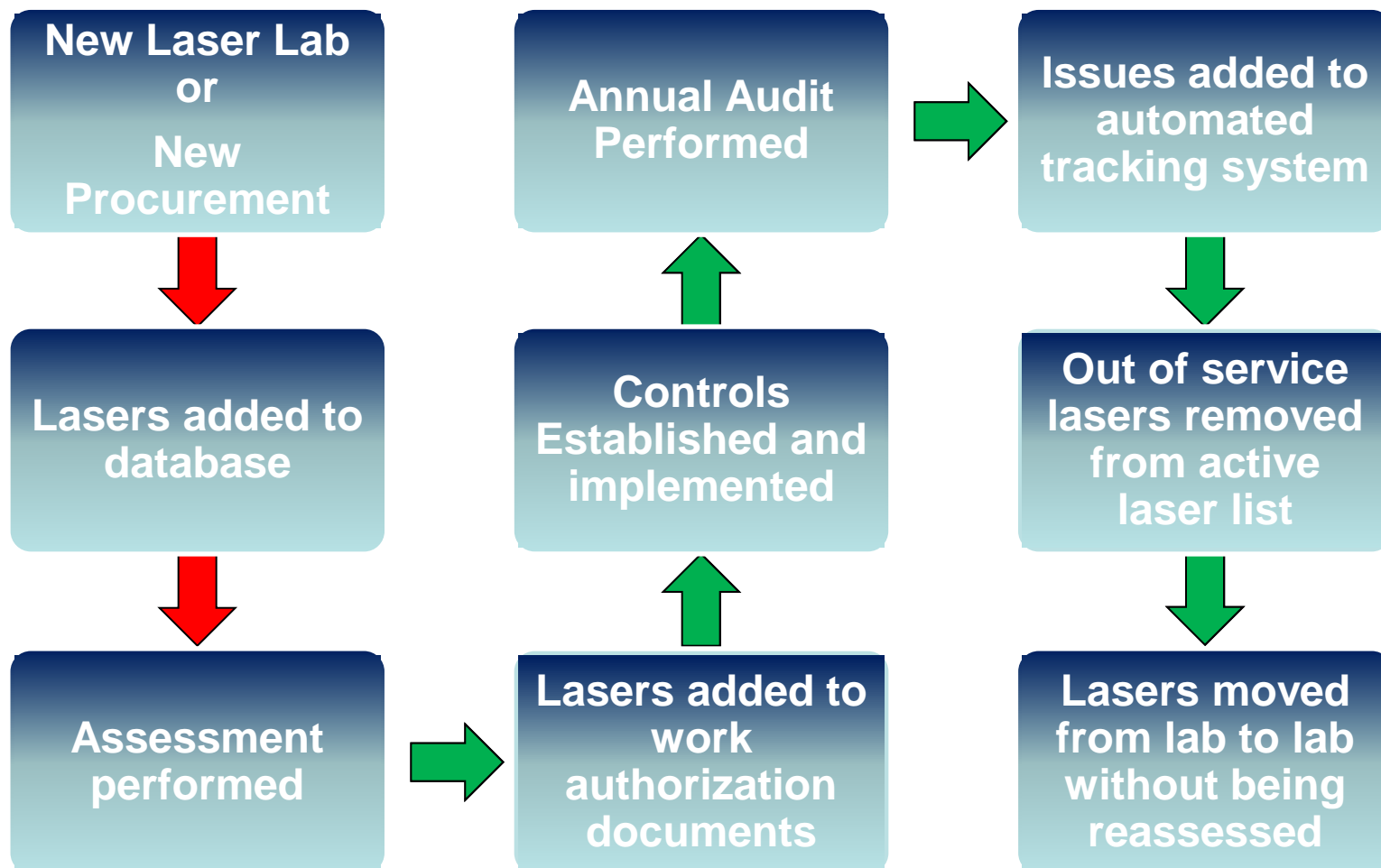
# Why fix it?

- Control banding work authorization process
- Issues tracking and reporting
- Time and labor burden
- Advancement in wireless technology and security

# The development process



# Process Flow





# The result

- LSO time burden is reduced significantly.
- Interruption to the program minimized.
- Assessments documented through the database.
- Laser database is searchable and intuitive.
- Virtually every aspect of program is automated.
- Data collection/assessments performed in real time.
- Automation reduces the chances of human error.
- Automatic issue and audit tracking.
- All notifications are automated.
- An overall easier managed laser safety system.

# Questions?